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10/002,855	11/30/2001	Anne E. Miller	042390.P12072	3668

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Mark V. Seeley
BLAKELY, SOFOLOFF, TAYLOR & ZAFMAN
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER
UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
1765	5

DATE MAILED: 07/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/002,855	Applicant(s) MILLER, ANNE E.	
	Examiner Lynette T. Umez-Eronini	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 15-26 is/are pending in the application.

4a) Of the above claim(s) 24-26 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 15-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 15, 17, 18, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Watts et al. (US 5,897,375).

Watts teaches, "In particular, the slurry taught herein contains an oxidizing agent (e.g., hydrogen peroxide H_2O_2), a citrate salt (e.g., ammonium citrate or potassium citrate), an abrasive slurry (e.g., alumna abrasive or silica abrasive), and a balance of a solvent such as deionized water or an alcohol. In addition, the compound 1,2, 4-triazole or a triazole derivative such as benzotriazole (same as applicant's corrosion inhibitor) can be included within the slurry to improve copper polishing planarity" (column 2, lines 27-37). "In general, the oxidizing agent (H_2O_2) of the slurry **24** may be within any range of roughly 0.2 weight percent (wt %) to 5.0 weight percent (wt %). The carboxylate salt or citrate salt can be within a range of roughly 0.2 weight percent to roughly 20 weight percent. The abrasive slurry (alumna abrasive) is roughly 1.0 weight percent to 12.0 weight percent of the slurry **24**" (column 5, lines 7-13). It is noted that Watts further teaches, "A typical abrasive which has been experimentally shown to result in good copper removal and planarization is an alumina abrasive, but a silica abrasive in lieu of the alumina abrasive or in addition with alumina may be used" (column 4, lines 61-65),

which provides evidence that silica can be substituted for alumina. "In addition, an optional triazole or triazole derivative can be provided within the slurry **24** to be roughly 0.05 weight percent to 2.0 weight percent of the slurry **24**. A remaining balance of the slurry . . . is typically deionized water . . ." (column 5, lines 13-17). Hence the above reads on:

A slurry for polishing comprising a mixture of:

between about 0.01 mole and about 0.1 mole per liter of a citric acid salt;

between about 1% and 20% by volume of a silica based abrasive;

between about 0.0004 and about 2 moles per liter of an oxidizer; and

water solvent, **as in claim 15**. Since Watts' polishing composition is the same as that of applicant's polishing mixture, then using Watts' polishing composition in the same manner as the claimed invention would inherently result in a slurry for polishing a barrier layer as **in claim 15**.

The above aforementioned further reads on,

between 0.001 mole and about 0.05 mole per liter of a corrosion inhibitor, **in claim 17**;

the corrosion inhibitor that is selected from the group consisting of benzotriazole, **in claim 18**; and

A slurry comprising a mixture of:

14.7 grams per liter of a citric acid salt;

between about 4.4% and about 8.85 by volume of a silica based abrasive; and

.38 grams per liter of a 30 % H_2O_2 solution, **as in claim 22**. It is noted that hydrogen peroxide may be obtained from commercial sources in the concentration ranges of 30-35 percent. Since Watts' polishing composition is the same as that of applicant's polishing mixture, then using Watts' polishing composition in the same manner as in the claimed invention would inherently result in a slurry for polishing a barrier layer, **as in claim 22**.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 16, 19, and 20; and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watts (US '375) as applied to claims 15 and 22 respectively above, and further in view of Kaufman al. (US 5,954,997).

Watts differs in failing to specify the slurry wherein the mixture has a pH that is greater than about 7.0, **in claims 16 and 23**.

Kaufman teaches, "It is desirable to maintain the pH of the CMP slurry of this invention within a range of from about 2.0 to about 12.0, and preferably between form about 4.0 and 9.0 in order to facilitate control of the CMP process"(column 8, lines 22-25).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Watts by maintaining a cmp slurry that has a pH greater than 7.0 as taught by Kaufman for the purpose of facilitating control of the CMP process (Kaufman, column 8, lines 22-25).

Watts differs in failing to teach the slurry comprising less than 0.1 wt % of a surfactant, **in claim 19**; and a surfactant that is selected from the group as recited **in claim 20**.

Kaufman's slurry further includes a variety of optional additives such as surfactants that stabilize the dispersion of abrasive in the slurry against settling, flocculation, and decomposition (column 6, lines 32-37) and that range from 0.001 and 2% by weight (column 6, lines 55-58), which provides evidence that a slurry comprises and less than 0.1 wt % of a surfactant, as claimed in the present invention.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Watts by employing a slurry that comprises a surfactant, as taught by Kaufman for the purpose of promoting stabilization of a CMP slurry against settling, flocculation, and decomposition (Kaufman, column 6, lines 34-36).

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watts (US '375) as applied to claim 15 above, and further in view of Payne (US 4,752,628).

Watts differs in failing to teach the slurry further comprising less than about 300 ppm of the biocide.

Payne teaches a lapping composition that is made up of 0.05 - 3 % (~ 500 ppm – 30,000 ppm) by weight biocide (column 1, lines 22-24 and 30, and 51-60), which provides evidence that the concentration of biocide in a slurry varies and is a so-called "result effective variable."

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Watts by varying the concentration of a biocide in a lapping (polishing) composition as taught by Payne, since it has been disclosed that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and for the purpose of preparing a slurry that remain stable upon storage and shipment to the end user from a manufacturer or formulator (Payne, column 2, lines 44-46).

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable reached on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

ltue
July 3, 2003

BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700